

June 2008

# Type 98HH Backpressure and Relief Valves



W2592-1

*Figure 1. Type 98HH Relief Valve*



## WARNING

Fisher® relief valves must be installed, operated, and maintained in accordance with federal, state, and local codes, rules and regulations, and Fisher instructions.

If the spring case develops a leak or if the outlet continually vents gas, service to the unit may be required. Failure to correct trouble could result in a hazardous condition. Only a qualified person must install or service the unit.

## Introduction

Type 98HH (see Figure 1) valve provides relief or differential relief in liquid, gas, air, and steam service applications. Outlet pressure settings range from 150 to 375 psig (10,3 to 25,9 bar). Bodies are available in 1/4, 1/2, 3/4, and 1-inch (DN 15, 20, and 25) sizes.

## Specifications

Specifications for the Type 98HH are given on page 2.

# Type 98HH

## Specifications

### Available Constructions

Self-operated with standard adjusting screw.

### End Connection Style

NPT, socket weld, or ANSI flanged-14-inches face-to-face (DIN flanged-356 mm face-to-face)

### Body Sizes

1/4, 1/2, 3/4, and 1-inch  
(DN 15, 20, and 25)

### Maximum Inlet Pressures, Psig (bar)<sup>(1,5)</sup>

(Set Pressure Plus Build up)

TYPE NUMBER	STEEL (WCC) OR STAINLESS STEEL SPRING CASE ALL TRIMS TO 150°F <sup>(2)</sup> (66°C)	CAST IRON SPRING CASE			
		All Trims to 150°F <sup>(3)</sup> (66°C)	Metal Trims <sup>(4)</sup>	To 315°F (157°C)	To 406°F (208°C)
98HH	400 (27,6)	400 (27,6)	300 (20,7)	250 (17,2)	

### Relief Pressure Range

150 to 375 psig (10,3 to 25,9 bar)

### Allowable Temperature Ranges<sup>(5)</sup>

**Nitrile (NBR) Parts:** -20° to 200°F (-29 to 93°C)

**Neoprene (CR) Parts:** -40° to 150°F (-40 to 66°C)

**Fluorocarbon (FKM) Parts:**

0° to 300°F (-18° to 149°C)

**Metal Diaphragm and Seat**

*Cast Iron Body and Spring Case:*

-40° to 406°F (-40° to 208°C)

*Steel Body and Spring Case:*

-20° to 450°F (-29° to 232°C)

*Stainless Steel Body and Spring Case:*

-40° to 450°F (-40° to 232°C)

### Approximate Weights, Pounds (kg)

**1/4-inch Body:** 8 (3,63)

**1/2-inch (DN 15) Body:** 8 (3,63)

**3/4-inch (DN 20) Body:** 20 (9,07)

**1-inch (DN 25) Body:** 20 (9,07)

1. Relief pressure setting plus maximum allowable buildup over setting.
2. Or fluorocarbon trims to 300°F (149°C) or metal trims to 450°F (232°C).
3. Or fluorocarbon trims to 300°F (149°C).
4. Interpolate for intermediate pressure ratings.
5. The pressure/temperature limits in this manual and any applicable standard limitation should not be exceeded.

## Principle of Operation

See Figure 2. Type 98HH relief and backpressure valves relieves excessive pressures upstream of the main regulator. If the upstream pressure rises above the setting of the relief valve, pressure on the underside of the diaphragm overcomes the spring compression. The valve plug moves away from the orifice and allows the excess pressure to escape. When the upstream pressure returns to normal, the plug resumes a closed position.

## Installation

Unbox and inspect the valve. Remove pipe scale and other foreign material from the connecting pipeline. Apply a suitable pipe compound to the male threads. The relief valve can be installed in any position as long as the flow is in the direction indicated by the arrow cast on the body. The design of the valve isolates the diaphragm and pressure response chamber from the main flow stream. High pressure is measured inside the body through a registration hole on the inlet side of the body. If loading pressure is required, connect the loading pressure line to the NPT connection in the

spring case. This connection is 1/8-inch NPT for 1/4-inch bodies, 1/4-inch NPT for 1/2-inch (DN 15) bodies. If loading pressure is not required, this connection should be vented to atmosphere.

Maximum operating temperatures for the Type 98HH relief valves are as follows:

Elastomer diaphragm or seat: 150°F (66°C)

Metal diaphragm or seat: 406°F (208°C) with a cast iron body and spring case or 450°F (232°C) with a steel or stainless steel body and spring case.

## Vents



**WARNING**

If the process fluid is hazardous, install remote vent lines to carry fluid to a safe area.

If remote venting is necessary, install a remote vent line in the spring case and outlet connections of Type 98HH relief valve. The vent lines must have the largest practical diameter and be as short as possible with a minimum number of bends or elbows.

## Overpressure



### WARNING

**Overpressuring any portion of this equipment may cause equipment damage, leaks in the relief valve, or personal injury due to bursting of pressure-containing parts. The system should be inspected after any overpressure condition.**

Relief pressure settings range from 150 to 375 psig (10,3 to 25,9 bar).

## Adjustment

Each unit is factory set for the pressure setting specified on the order. If adjustment is necessary, use a pressure gauge to monitor the pressure. Turn the adjusting screw (key 15) clockwise to increase the pressure or differential pressure setting. To decrease the setting, turn the adjusting screw counterclockwise.

## Maintenance



### WARNING

**To avoid personal injury and equipment damage, isolate the valve from all pressure. Cautiously release pressure from the relief valve before attempting disassembly.**

Due to normal wear and damage that may occur from external sources, relief valve parts such as the O-rings, gaskets, diaphragm, orifice, and valve plug should be inspected periodically and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions or the requirements of state and federal laws.

Instructions are given below for disassembly of the Type 98HH relief and backpressure valves. These valves do not have to be removed from the pipeline to inspect internal parts. Suitable lubricants are indicated on the assembly drawings. Apply the lubricants as the relief valve is being reassembled. Refer to Figure 3 while servicing the relief valve.

## Disassembly to Replace Diaphragm and Seats

If the relief valve is leaking, the diaphragm may be ruptured or the seating surfaces nicked or scratched. Proceed as follows to replace or repair the diaphragm, orifice, and valve plug.

1. Release all spring compression from the diaphragm by turning the adjusting screw (key 15) counterclockwise.
2. Remove cap screws (key 16) and lift off the spring case (key 2), spring (key 11), upper spring seat (key 9) and diaphragm assembly. (The diaphragm assembly includes the locknut, key 26; pusher post, key 6; lock washer, key 23; lower spring seat, key 8; diaphragm, key 12; gasket, key 10; washer, key 7).

### Note

**There are two diaphragms if the diaphragm material is metal or fluorocarbon.**

3. Check the orifice (key 3). If it needs replacing or repairing, unscrew the valve plug guide (key 5) and then the orifice. The valve plug can be removed by sliding it off of the pusher post.

### Note

**If damage to elastomer or metal seating surfaces is severe, replace the orifice and valve plug O-ring with new parts. However, by following the lapping procedure below, it is possible to repair metal seating surfaces if they are only slightly worn or scratched.**

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## 4. Lapping procedure:

- a. Place a small amount of 500-grit silicon carbide or aluminum oxide lapping compound on a flat surface such as a piece of heavy plate glass.
- b. Take the valve plug or orifice and move it in a Figure 8 motion on the lapping compound. Do not allow the part to tip or rock since this would round the corners.
- c. Repeat step b for each part, using an 800-grit or 1000-grit silicon carbide or aluminum oxide lapping compound.
- d. Wash away all traces of the lapping compound. To help prevent scratching the seating surfaces, a light coat of oil may be applied before returning the valve plug and the ring to the body.

5. Return the orifice and valve plug guide to the body.
6. To replace the valve plug O-ring (key 22), remove the screw (key 24) and O-ring retainer (key 21) from the plug. Remove and replace the spring O-ring.
7. Remove the locknut from the pusher post in order to separate the parts of the diaphragm assembly. Inspect, and replace if necessary, the diaphragm, diaphragm gasket (key 19), and pusher post gaskets (key 10).

### Note

**These valve have either a metal or elastomer diaphragm. If a metal diaphragm is to be replaced with an elastomer diaphragm or an elastomer diaphragm with a metal diaphragm, a new pusher post is required.**

8. Slip the plug back onto the pusher post and return the rest of the diaphragm assembly parts to the pusher post in the following order: gasket, diaphragm, O-ring, lower spring seat, and washer. Screw on the locknut.
9. Place the diaphragm gasket on the body and put the diaphragm assembly into position in the body.
10. Set the spring and upper spring seat over the lower spring seat. Place the upper casing on the body, tightening the cap screws finger-tight only.
11. To ensure proper slack in the diaphragm, apply some spring compression by turning the adjusting screw clockwise. Tighten the cap screws.

## Parts Ordering

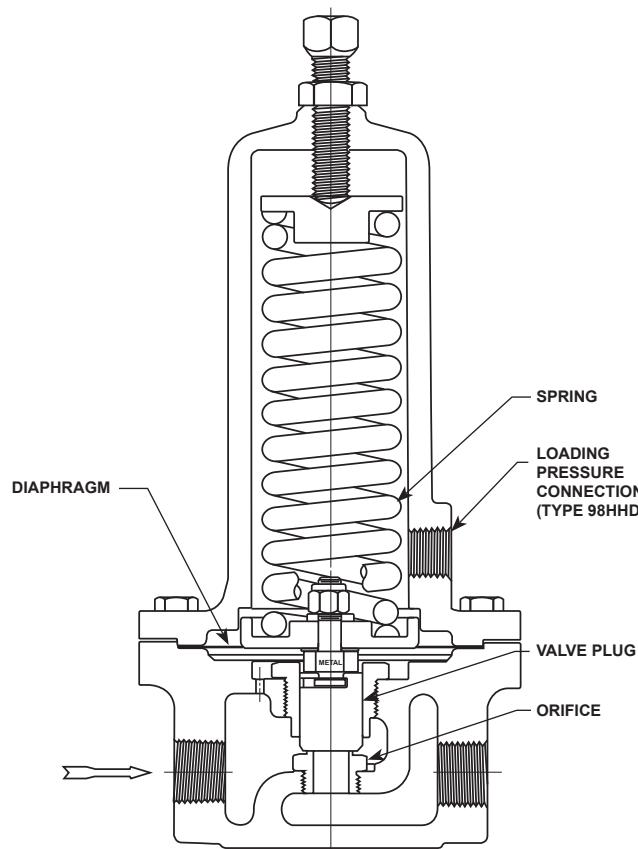
When corresponding with your local Sales Office about this equipment, be sure to include the type number and other information stamped on the nameplate.

When ordering replacement parts, reference the key number each needed part and specify the eleven-character part number as found in the following parts list.

## Parts List

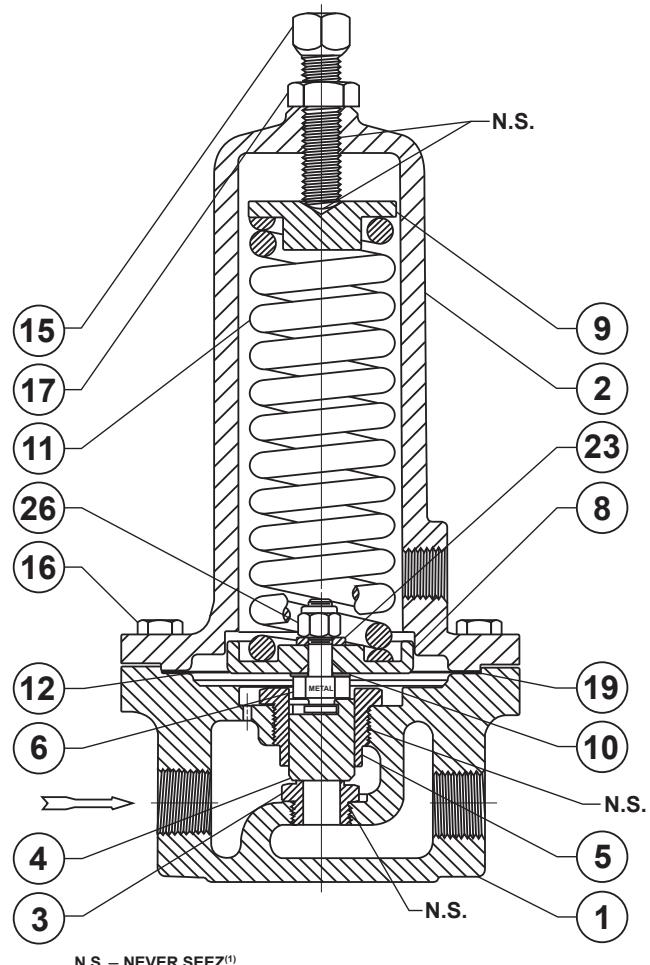
Key	Description	Part Number
	Parts kit (included are keys 3, 4, 10, 12, 19, 21, 22 and 24)	
	Elastomer Trim	
	1/4-inch body	R98HX000012
	1/2-inch (DN 15) body	R98HX000022
	3/4 and 1-inch (DN 20 and 25) bodies	R98HX000032
	Metal Trim	
	1/4-inch body	R98HX000042
	1/2-inch (DN 15) body	R98HX000052
	3/4 and 1-inch (DN 20 and 25) bodies	R98HX000062
1	Body	
	Cast iron	
	1/4-inch NPT	1L346419012
	1/2-inch NPT	2L339519012
	3/4-inch NPT	2L342519012
	1-inch NPT	2L342619012
	Steel	
	1/4-inch NPT	1L372122012
	1/2-inch NPT	2L368722012
	3/4-inch NPT	2L373422012
	1-inch NPT	2L373522012
	316 stainless steel	
	1/4-inch NPT	1L372133092
	1/2-inch NPT	2L368733092
	3/4-inch NPT	2L373433092
	1-inch NPT	2L373533092
2	Spring Case	
	Cast iron	
	1/4-inch body	2P181922012
	1/2-inch (DN 15) body	2P182122012
	3/4 and 1-inch (DN 20 and 25) bodies	3P182422012
	Steel	
	1/4-inch body	2P181922012
	1/2-inch (DN 15) body	2P182122012
	3/4 and 1-inch (DN 20 and 25) bodies	3P182422012
3*	Orifice	
	Metal to metal seat	
	416 stainless steel	
	1/4-inch body	1E391646172
	1/2-inch (DN 15) body	1E395046172
	3/4 and 1-inch (DN 20 and 25) bodies	1E398046172

\*Recommended spare part.



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**Figure 2.** Operational Schematic for Type 98HH Relief Valves



30A7036-A

**Figure 3.** Type 98HH Relief Valve Assembly with Metal Seals

1. Never-Seez mark owned by Never-Seez Corp.

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Key	Description	Part Number	Key	Description	Part Number
3*	Orifice (continued)		6	Pusher Post	
	Metal to metal seat			Elastomer Diaphragm	
	316 stainless steel			416 stainless steel	
	1/4-inch body	1E391635072		1/4-inch body	1L345635132
	1/2-inch (DN 15) body	1E395035072		1/2-inch (DN 15) body	1L3416X0102
	3/4 and 1-inch (DN 20 and 25) bodies	1E398035072		3/4 and 1-inch (DN 20 and 25) bodies	1L343835132
	Elastomer Seat			316 stainless steel	
	416 stainless steel			1/4-inch body	1L345635072
	1/4-inch body	1L345935132		1/2-inch (DN 15) body	1L344235072
	1/2-inch (DN 15) body	1L341735132		3/4 and 1-inch (DN 20 and 25) bodies	1L343835072
	3/4 and 1-inch (DN 20 and 25) bodies	1L343135132		Metal Diaphragm	
	316 stainless steel			416 stainless steel trim	
	1/4-inch body	1L345935072		1/4-inch body	1L345735132
	1/2-inch (DN 15) body	1L341735072		1/2-inch (DN 15) body	1L344535132
	3/4 and 1-inch (DN 20 and 25) bodies	1L343135072		3/4 and 1-inch (DN 20 and 25) bodies	1L343935132
4*	Valve Plug			316 stainless steel trim	
	Metal to metal seat			1/4-inch body	1L345735072
	416 stainless steel			1/2-inch (DN 15) body	1L344535072
	1/4-inch body	1L345246172		3/4 and 1-inch (DN 20 and 25) bodies	1L343935072
	1/2-inch (DN 15) body	1L344146172	7	Washer (elastomer diaphragm only)	
	3/4 and 1-inch (DN 20 and 25) bodies	1L343746172		416 stainless steel trim	
	316 stainless steel			1/4-inch body	1L344736012
	1/4-inch body	1L345235072		1/2-inch (DN 15) body	1L339836012
	1/2-inch (DN 15) body	1L344135162		3/4 and 1-inch (DN 20 and 25) bodies	1L342836012
	3/4 and 1-inch (DN 20 and 25) bodies	1L343735162		316 stainless steel trim	
	Elastomer Seat			1/4-inch body	1L344736142
	416 stainless steel			1/2-inch (DN 15) body	1L339835072
	1/4-inch body	1L345135132		3/4 and 1-inch (DN 20 and 25) bodies	1L342836142
	1/2-inch (DN 15) body	1L344335132	8	Lower Spring Seat	
	3/4 and 1-inch (DN 20 and 25) bodies	1L343635132		1/4-inch body, aluminum	1N942009012
	316 stainless steel			1/2-inch (DN 15) body, steel zinc plate	1N943024272
	1/4-inch body	1L345135072		3/4 and 1-inch (DN 20 and 25)	
	1/2-inch (DN 15) body	1L344335072		bodies, steel zinc plate	1N943824272
	3/4 and 1-inch (DN 20 and 25) bodies	1L343635072	9	Upper Spring Seat, steel	
5	Valve Plug Guide			1/4-inch body	1N942124092
	416 stainless steel			1/2-inch (DN 15) body	1N943124092
	1/4-inch body	1L345835132		3/4 and 1-inch (DN 20 and 25) bodies	1N943924092
	1/2-inch (DN 15) body	1L341635132	10*	Gasket, elastomer	
	3/4 and 1-inch (DN 20 and 25) bodies	1L342935132		1/4-inch body	1L344804022
	316 stainless steel			1/2-inch (DN 15) body	1L341104022
	1/4-inch body	1L345835072		3/4 and 1-inch (DN 20 and 25) bodies	1L343404022
	1/2-inch (DN 15) body	1L3416X0102			
	3/4 and 1-inch (DN 20 and 25) bodies	1L342935072			

\*Recommended spare part.

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Key	Description	Part Number	Key	Description	Part Number
11	Relief Valve Spring, steel zinc plate 1/4-inch body 1/2-inch (DN 15) body 3/4 and 1-inch (DN 20 and 25) bodies	1N942227142 1N943427142 1N944127182	21	O-Ring Retainer (elastomer seat only) 1/4-inch body 416 stainless steel 316 stainless steel 1/2-inch (DN 15) body 416 stainless steel 316 stainless steel	1L346035132 1L346035072
12*	Diaphragm 1/4-inch body Neoprene (CR) Fluorocarbon (FKM) (2 required) 302 stainless steel (2 required) 1/2-inch (DN 15) body Neoprene (CR) Fluorocarbon (FKM) (2 required) 302 stainless steel (2 required) 3/4 and 1-inch (DN 20 and 25) bodies Neoprene (CR) Fluorocarbon (FKM) (2 required) 302 stainless steel (2 required)	1L344902112 1L344902402 1L345036012 1L341202112 1L341202402 1L339936012 1L343302112 1L3433X0032 1L343236012	22*	O-Ring (elastomer seat only) 1/4-inch body Nitrile (NBR) Fluorocarbon (FKM) 1/2-inch (DN 15) body Nitrile (NBR) Fluorocarbon (FKM)	1L341535232 1L341535072 1L343035132 1L343035072 1C853806992 1C8538X0052
15	Adjusting Screw, steel plate 1/4-inch body 1/2-inch (DN 15) body 3/4 and 1-inch (DN 20 and 25) bodies	1E639928982 1E268028982 1N944028982	23	Lockwasher, steel 1/4 and 1/2-inch (DN 15) bodies 3/4 and 1-inch (DN 20 and 25) bodies	1C782106992 1C7821X0072
16	Cap Screw, steel zinc plate 1/4-inch body (6 required) 1/2-inch (DN 15) body (8 required) 3/4 and 1-inch (DN 20 and 25) bodies (8 required)	1K764624052 1B787724052 1C403824052	24	Machine Screw, stainless steel (elastomer seat only) 1/4-inch body 1/2-inch (DN 15) body 3/4 and 1-inch (DN 20 and 25) bodies	1C225628982 1H624328992
17	Jam Nut, steel zinc plate 1/4-inch body 1/2-inch (DN 15) body 3/4 and 1-inch (DN 20 and 25) bodies	1A352224122 1A352424122 1A319224122	26	Locknut, steel zinc plate 1/4 and 1/2-inch (DN 15) bodies 3/4 and 1-inch (DN 20 and 25) bodies	1J4159X0012 1L343538992
18	Drive Screw, stainless steel not shown (2 required)	1A368228982			1L872324122 1L872224122
19*	Diaphragm Gasket, elastomer Use with 302 stainless steel diaphragm 1/4-inch body 1/2-inch (DN 15) body 3/4 and 1-inch (DN 20 and 25) bodies	1E393104022 1E396104022 1E399304022			

\*Recommended spare part.

# Type 98HH

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